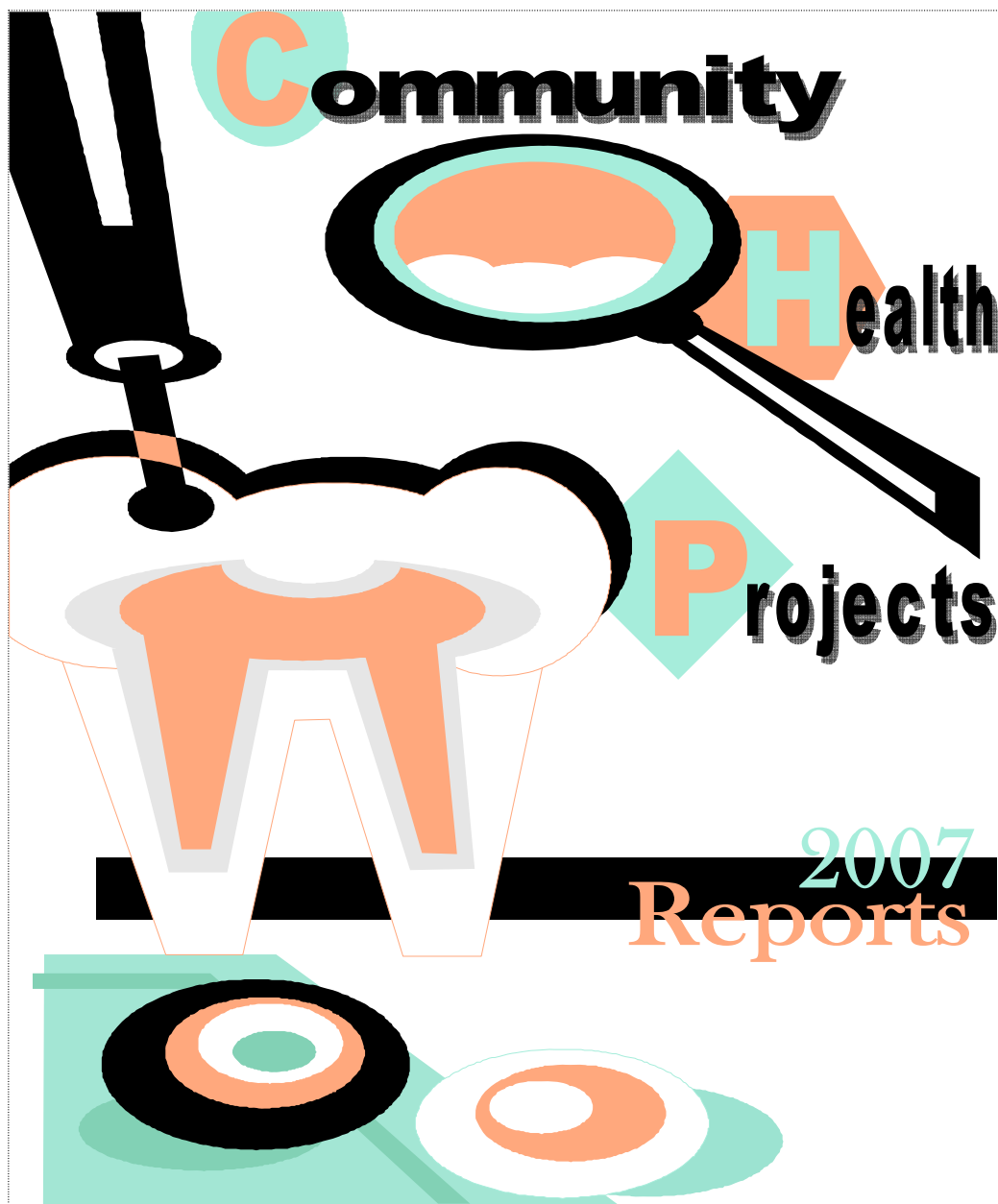




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Oral health status of young people with cerebral palsy in Hong Kong



Oral health status of young people with cerebral palsy in Hong Kong

Community Health Project

2007

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Oral health status of young people with cerebral palsy in Hong Kong

Abstract

Aims: The aims of the study were to describe caries and periodontal status of young people aged 12 or above with cerebral palsy studying in special schools in Hong Kong. **Method:** Students aged 12 or above studying in the three special schools of the Spastics Association of Hong Kong were invited for this study. Parental consent was sought and the medical history of each participant was checked before the examination. They were examined in their schools with CPI probe and dental mirror with fibre-optic light. Each participant or a parent was asked to respond to a questionnaire on oral hygiene habits. **Results:** In total, 89 students were invited and 65, 36 boys and 29 girls, participated in this survey. Their mean age was 15 ± 2 . About 74% of them were spastic and 47% were quadri/triplegia. About half of the subjects (49%) had mild mental retardation and another 31% were moderately retarded. The caries experience as measured by DMFT was 1.2 ± 1.9 . Many of them (62%) had no caries experience. None of the surveyed students had healthy gum and many of them (57%) had calculus. They all practiced daily tooth brushing and about one third (32%) used mouthrinse. **Conclusion:** The caries experience of young people with cerebral palsy in Hong Kong was not high, but their periodontal conditions were poor and more than half of them had calculus.

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Chapter 1 Introduction

1.1 Definition of cerebral palsy

Cerebral palsy (CP) is a well-recognized neuro-developmental condition beginning in early childhood and persisting through the lifespan (Mutch et al., 1992). Originally reported by Little in 1861 (and originally called 'cerebral paresis'), CP has been the subject of books and papers by some of the most eminent medical minds of the past hundred years. It has always been a challenge to define CP, as documented by the number of attempts that have been made over the years (Mac Keith et al., 1959; Bax, 1964; Mutch et al., 1992).

Traditional classification schemes have focused principally on the distributional pattern of affected limbs (for example hemiplegia or diplegia) with an added modifier describing the predominant type of tone or movement abnormality (e.g. spastic or dyskinetic), but it has become apparent that additional characteristics must be taken into account for a classification scheme to contribute substantively to the understanding and management of this disorder. Nevertheless, the traditional classification is still commonly used in communication among the medical professionals.

An International Workshop on Definition and Classification of CP was held in 2004 and CP was defined as a group of disorders affecting the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behaviour, and/or by a seizure disorder (Bax et al., 2005).

1.2 Prevalence of cerebral palsy

The reported prevalence of CP varies from 1.2 to 2.5 per 1000 live births world-wide and the differences in prevalence rates may be due to different study designs (Stanley et al., 2000; Suzuki and Ito, 2002). A study that surveyed 6-year-old children in Japan found an incidence of CP from 1977 to 1991 of 1.3 per 1000. A cross-sectional study of children aged below 7 in China reported a prevalence of 1.6 per 1000 children with CP. A recent study reported that the prevalence of CP in Hong Kong children was 1.3 per 1,000 children (Yam et al., 2006).

1.3 Classification of cerebral palsy

CP can be traditionally classified according to the type of tone or movement abnormality of the individuals. It can be classified into five types: spastic, dyskinetic (athetoid), ataxic, hypotonic and mixed types (Howle, 2002).

Spastic type - Movement in spastic people is difficult due to stiffness and rigidity of the extremities. Stiffness increases when they attempt to increase the speed of movement.

Dyskinetic type - Dyskinetic people are those with athetoid movements (Athetosis). Athetosis means 'a lack of fixation'. Movements are involuntary, slow and uncontrolled. Involuntary movements become obvious when the athetoid person is excited. Speech may be hard to understand due to difficulties in controlling tongue muscles, vocal cord and breathing. Athetoid people have difficulties in maintaining stable postures and balance (Spastics Association of Hong Kong, 2007).

Ataxic type - Ataxic means "shaking" and is uncommon nowadays (Howle, 2002). People with ataxia cannot walk steadily. They have poor balance in

body movement and eye-hand coordination. Tremor may be present as well (Spastics Association of Hong Kong, 2007).

Hypotonic type - Hypotonic type is characterized by muscle flaccidity with decreased functions (Howle, 2002). These people show decreased ability to generate voluntary muscle force and maintain posture (Welbury, 2001). Movements are slow and not coordinated (Spastics Association of Hong Kong, 2007).

Mixed type - Mixed type means symptoms of more than one type of involvement are present. For example, an individual who is ataxic may also be associated with hypotonia (Welbury, 2001).

Spastic is the most common type, among the five types of CP, followed by dyskinetic. Hypotonic and ataxic are relatively rare (Welbury, 2001). Mental retardation and epilepsy may occur in severe cases which may cause great limitation to the quality of life (Fortune, 2004).

A traditional classification that focused principally on the distributional pattern of the affected limbs is also commonly used. This classification categorizes people with spastic type of CP according to the areas of involvement. They are hemiplegia, diplegia, triplegia and quadriplegia of which hemiplegia is the most common form (Spastics Association of Hong Kong, 2007).

Hemiplegia affects one side of the body only. Mobility is usually normal on one side while the other side limps or drags during walking or running.

Diplegia affects both legs but the arms are unaffected. Legs are usually turned inwards and close together. They rely heavily on their arms for activities and balance, and feel insecure when standing. They usually walk in a scissor pattern, i.e. legs crossing each other, and walking on toes.

Triplegia and quadriplegia affect three and four limbs respectively. These people have general motor disorders affecting the limbs, face and trunk. They have high risks of developing contractures and deformities.

A significantly higher percentage of biting reflex in people with quadriplegia was observed, while this is absent in people with hemiplegia (Dos Santos and Nogueira, 2005).

1.4 Aetiology of cerebral palsy

CP is caused by hypoxia damaging the brain of the fetus. The damage may occur before, during or shortly after birth. It can also arise from a long labour period, disturbed circulation in the umbilical cord, premature birth, head injuries, and viral infections such as German measles (Surabian, 2001).

1.5 Problems associated with cerebral palsy

There are many associated problems in addition to the motor deficit which depend on the areas of brain damage (Scully and Cawson, 2005). They may have sensory impairment (visual, hearing, tactile and pain), speech impairment which is subsequent to the hearing impairment, oral motor malfunction, inability in exploring the environment and low motivation to interact with others.

Cognitive impairment may be present which can affect memorization, attention and intelligence (Spastics Association of Hong Kong, 2007). Generally, one-third of CP persons have average intelligence, one-third being mildly impaired, and the remaining one-third being severely impaired. Emotional and psychological disturbances, such as depression, passivity, poor adaptive ability and low self-esteem are also common symptoms.

There are also musculoskeletal problems such as muscle contractures, osteoporosis, early joint degeneration and joint deformity/dislocation. They may also have other health problems such as malnutrition, poor physical fitness, high energy expenditure and early fatigue (Spastics Association of Hong Kong, 2007).

1.6 Medical management of people with cerebral palsy

Due to the permanent damage to the brain, CP cannot be cured completely. However a variety of therapies and treatments are available to help the child to improve motor skills, coordination, intellectual development and communications (Spastics Association of Hong Kong, 2007).

Treatments include, but are not limited to, physiotherapy, occupational therapy, speech therapy, medication and surgery. Physiotherapy helps stretch spastic muscles and improve coordination. Occupational therapy helps develop skills for everyday activities. Speech therapy can address and solve problems in communication. Medications can control seizures, relax muscle spasms and alleviate pain. Surgery can correct anatomical abnormalities and release tight muscles. Orthotic devices are also useful to improve walking and

posture. Wheelchairs and rolling walkers help those who are not independently mobile. Communication aids such as computers with attached voice synthesizers can be used to help communicating with others (National Institute of Health, 2007).

1.7 The Spastics Association of Hong Kong

The Spastics Association of Hong Kong (SAHK) is the most representative association which was established in 1963 for people with CP. SAHK is a non-government (voluntary) organization that is funded by the departments concerned under the government, The Community Chest of Hong Kong, and allocation from the Lotteries Fund (Spastics Association of Hong Kong). Its objective is to assist spastics, physically disabled persons in Hong Kong, to develop and maintain services for their education and welfare in a holistic manner by adopting the principles of conductive education.

Existing services and facilities of SAHK include early education and training centres, pre-school centres, special schools, sheltered workshops, hostels, adult training centres, parents' resource centres, conductive learning centres, rehabilitation seating service centres and a domiciliary occupational therapy

unit. In addition, there are a staff development and research unit, and a workshop which provides supportive services such as wheelchair repair, appliance work, computer and electronics repair. In total, over 3,000 persons are now being served by the association (Spastics Association of Hong Kong, 2007).

SAHK runs three special schools, namely Jockey Club Elaine Field School, Ko Fook Lu Memorial School and B.M. Kotewall Memorial School. The schools provide free pre-primary, primary and junior secondary education. They aim to deliver a holistic education with an equal emphasis on the cognitive, physical and personality development of the students (Spastics Association of Hong Kong, 2007).

It was found that 62% of children with CP in Hong Kong were studying in special needs school (Yam et al., 2006). There are seven special needs schools in Hong Kong for children with physical disabilities. Among these seven schools, three of them mentioned above are launched by SAHK. Another three schools are by the Hong Kong Red Cross and the remaining one by the Hong Kong Christian Service. Many children with CP study in the special needs schools run by SAHK.

1.8 Dental features of people with cerebral palsy

Literature reported that CP people display a number of clinical dental features (Bhowate and Dubey, 2005; Rodrigues dos Santos et al., 2003; Pope and Curzon, 1991, Parkin et al., 1970). They are delayed eruption, malocclusion (increased prevalence of skeletal class II with anterior open bite), enamel hypoplasia, increased periodontitis and drug-induced gingival overgrowth, drooling and mouth breathing. Bruxism and TMJ problems can also be found (Welbury, 2001; Scully and Cawson, 2005).

1.9 Dental management of people with cerebral palsy

Dental management may be difficult for this group of people because some of them cannot move without any walking aids and some have communication problems. Moreover, uncontrollable movement on the dental chair also makes it difficult and manual support is often required. Anxiety during the dental appointment may worsen the spasticity (Scully and Cawson, 2005). All these problems may contribute to delayed treatment and therefore worsen existing problems. An untreated carious lesion may end up with extraction and lead to drifting, over-eruption or malocclusion afterwards.

1.10 Studies on dental status of people with cerebral palsy

A Danish study showed that individuals with the lowest caries experience were those who had the most severe forms of mental and motor disabilities (Nielsen, 1990). A survey in the United Kingdom found that children with CP had similar caries levels as non-handicapped children but had significantly higher plaque level and gingivitis. In addition, children with CP had more extracted and unrestored teeth and fewer and poorer quality restorations than children in control group (Pope and Curzon, 1991).

A study in Spain also found that the caries prevalence in children was not high (Gomis Subira, 2000). However, another study in Spain found a high caries prevalence in the adult population (Rodriguez Vazquez et al., 2002).

Two studies in India also reported a high caries prevalence in children with CP (Bhowate and Dubey, 2005; Gupta et al., 1993). Another study in India also reported a higher caries prevalence and poorer periodontal status in children with CP than the normal children (Bhavsar and Damle, 1995).

A study in Brazil reported a significantly higher caries experience for children with CP with permanent dentition of both genders when compared to normal children. In addition, children with CP were less likely to receive restorative care, and more likely to have carious teeth extracted (Rodrigues dos Santos et al., 2003).

Over the years, there are studies reporting the dental status of people with CP. Nevertheless, there is no agreement as to whether the dental status of people with CP is similar to normal people. A Medline search in April 2007 did not find any study reported in English on the dental status of the Chinese population. Therefore, the present study aims to investigate the dental status of Chinese people with CP in Hong Kong.

Chapter 2 Aims and Objectives

2.1 Aims

This outreach community health project is to investigate and to improve the oral health of young people aged 12 to 18 with cerebral palsy.

2.2 Objectives

The objectives of this outreach community health project are:

1. To study the caries status of permanent teeth of people aged 12 to 18
with cerebral palsy
2. To examine the periodontal status of people aged 12 to 18 with cerebral
palsy
3. To investigate oral hygiene habits of people aged 12 to 18 with cerebral
palsy
4. To deliver professional topical fluoride treatment to people aged 12 to 18
with cerebral palsy
5. To give oral health talks to the people aged 12 to 18 with cerebral palsy
and their parents and caregivers

Chapter 3 Materials and Method

3.1 A visit to the Spastic Association of Hong Kong

After the literature search and discussion amongst our group, the community health project was finally decided to study the oral health status of young people with CP. The group members paid a visit to SAHK in Queen's Road East, Hong Kong in December, 2006 (Table 1). Discussion was made with Mrs Louisa S. K. Law, the Deputy Chief Executive Officer of SAHK. The group sought support from the association to conduct an oral examination and a questionnaire survey to the students in the three special schools. The project proposal (Appendix 1), parental consent (Appendix 2) and questionnaire in Chinese (Appendix 3) were prepared and sent to the association in January, 2007. An English version of the questionnaire is shown in Appendix 4.

3.2 Study samples

The study invited all students aged 12 to 18 studying in the three special schools of SAHK. Since children below 12 had joined the school dental care service provided by the Department of Health, they received regular dental

care and their parents might not be keen on letting their children participate in this study.

3.3 Visits to the special schools

Through the arrangement made by the association, our group visited the three special schools in January and early February, 2007. Discussions were made with the principals, teachers and the school nurses regarding details of the project. The venues for the examination were confirmed. The medical record (Appendix 5), photo consent form (Appendix 6), oral examination charting form (Appendix 7) and the examination report (Appendix 8) were formulated and sent to the school before the field examination.

3.4 Calibration exercise

Two members of the group were assigned as examiners to measure the caries and periodontal status of the participants. Before the field examination, a calibration exercise was performed on 9th February, 2007 in main campus of the University of Hong Kong on the undergraduate university students. This aimed to ensure a good agreement between the two examiners in the diagnosis of caries and assessment of periodontal status (Table 1).

Table 1 Major events of the Community Health Project

Date	Event
15 Nov, 2006	Brain storming of possible community health Project
29 Nov, 2006	Finalization of the project title and project protocol
01 Dec, 2006	Initial contact with the Spastics Association of Hong Kong
22 Dec, 2006	Visit to the Spastics Association of Hong Kong
12 Jan, 2007	Confirmation of the topic of the project
19 Jan, 2007	Preparation of the project proposal
26 Jan, 2007	Visit to the B.M. Kotewall Memorial School
02 Feb, 2007	Visit to the Jockey Club Elaine Field School
02 Feb, 2007	Visit to the Ko Fook Lu Memorial School
08 Feb, 2007	Preparation of materials, instruments and equipments
09 Feb, 2007	Calibration exercise on clinical diagnosis
27 Feb, 2007	Main study at B.M. Kotewall Memorial School
28 Feb, 2007	Main study at B.M. Kotewall Memorial School
01 Mar, 2007	Main study at Jockey Club Elaine Field School
08 Mar, 2007	Main study at Ko Fook Lu Memorial School
09 Mar, 2007	Evaluation of the project
10 Mar, 2007	Data analysis and report writing
18 Apr, 2007	Oral health education talk
30 Apr, 2007	Submission of the community health report
02 Jul, 2007	Oral presentation of the community health project

3.5 Development of questionnaire

A close-ended questionnaire which comprised of five questions was designed to acquire information regarding the snacking and oral hygiene habits of the participants and their pattern of dental attendance (Appendix 3). In order to minimize the chance of misunderstanding and misinterpretation, pilot trials of the questionnaire survey were performed on 16 adults with different educational backgrounds. The clarity of the questions was checked and the final version was established.

3.6 Questionnaire survey

The project was conducted in late February and early March 2007 (Table 1) at the three schools (Table 2). It comprised of a questionnaire survey, a clinical oral examination and a topical application of fluoride varnish. The teachers distributed to and collected consent forms from the parents of the invited participants. The school nurses prepared the medical records and arranged the schedule of the examination of the participants.

Before the clinical oral examination, a questionnaire survey was conducted to all participants. The school nurses helped those with communication

difficulties. For those who had mild or moderate mental retardation, the questions were answered by their parents. Samples of the oral hygiene aids were provided to them for better understanding.

3.7 Clinical examination

The medical history of each participant was checked by the school nurses. Relevant history was recorded before the clinical examination (Appendix 5). The clinical examinations were performed by two examiners using a CPI probe and dental mirror with fibre-optic light. Cotton roll and gauze were used when necessary for moisture control and removal of debris on the tooth surfaces. Duplicate examination was carried out in 10 percent of the participants to assess the inter-examiner agreement. The school provided autoclave sterilizer to sterilize the instruments. The materials and instruments used were listed in Appendix 9.

The diagnosis of caries was performed according to the criteria suggested by the World Health Organization (WHO) 1997. The DMF index was used to denote the tooth status which was recorded in the charting form (Appendix 7).

Codes for tooth status are shown in Table 2.

Table 2 Codes used in caries diagnosis

Code	Details
0	Sound
1	Decayed
2	Filled, with decay
3	Filled, with no decay
4	Missing, as a result of caries
5	Missing, any other reason
6	Fissure sealant
7	Bridge abutment or special crown
9	Not recorded

Community Periodontal Index (CPI) adapted from WHO 1997 were used to assess periodontal status (Table 3). For CPI, only codes 0, 1 and 2 were used in the assessment to indicate healthy, gingival bleeding and calculus respectively. The CPI codes 3 and 4 were not used as there were false pockets in the participants examined.

Table 3 Codes used in periodontal assessment

Code	Details
0	Healthy periodontium
1	Bleeding observed, directly or by using a mouth mirror, after probing
2	Calculus detected during probing

The mouth was divided into six sextants defined by FDI tooth numbers 18-14; 13-23; 24-28; 38-34; 33-43; 44-48. Six index teeth (all first molars, upper right central and lower left central incisors) were examined. If no index tooth was present in a sextant qualifying for examination, all the remaining teeth in that sextant were examined and the highest score was recorded as the score for the sextant. In our study, third molars would not be scored.

3.8 Topical fluoride application

After clinical examination, Duraflor (Pharmascience Inc., Montreal, Canada 1-800-361-2862), a 5% sodium fluoride varnish (22,400 ppm F) was applied with cotton buds on all molar teeth and anterior carious teeth. An examination report (Appendix 8) was given to the school nurses who would then send it to the parents of the participants.

3.9 Data analysis

The data from the questionnaires and charting sheets were entered in Microsoft Excel 2007 and proofread four times by four members. Inter-examiner reproducibility was computed using Cohen's Kappa statistics. The data were analysed using SPSS 14.0 (SPSS Inc., Chicago, Illinois 60606; 1-312-651-3000) for descriptive frequencies. Student-t test was used to study the influence of gender, mental retardation, parental assistance in tooth brushing and use of dental cleaning aids on their caries experience and periodontal health of the participants.

3.10 Oral health care talk

Oral health care talks were held in the three schools to provide oral health education to the participants and their parents (Table 1). All students, whether participants or not, were invited for the talk. The talk included a slide show which emphasized the importance of oral health, the causes and the preventive aspects of periodontal diseases and caries. It also included the proper selection of common dental care products in the market such as toothpastes, toothbrush, dental floss, inter-dental brush etc. The findings of the study were discussed. Special care to these people such as prevention of

dental trauma and the need for parental assistance in tooth brushing were highlighted during the talk. Audiences were then divided into small groups for discussion after the talk. They were encouraged to ask questions. The proper tooth brushing technique was demonstrated. Electrical toothbrushes, toothpastes and dental floss were given as souvenir at the end of the discussion.

Chapter 4 Results

4.1 Sample size

A total of 89 students aged 12 or above from the three special schools were invited for the study. Sixty-five students, 36 boys and 29 girls, participated in this survey. The response rate was 73%. The age ranged from 12 to 18, with a mean age of 15 ± 2 . The male to female ratio was about 1.2: 1.

4.2 Inter-examiner reproducibility

Two examiners were responsible in assessing the caries status and the periodontal status. Duplicated examination was carried out in 10% of the participants without prior notification to the examiners. The Kappa statistics in caries diagnosis and periodontal assessment was 0.98 and 0.76 respectively. The level of inter-examiner agreement was satisfactory compared with the previous studies (Faculty of Dentistry, 2001; Kwan, 1992).

4.3 Spastic conditions

The majority of the participants (74%) were spastic with the remaining scattered into other categories (Table 4). Among the 53 participants who

were in the spastic or the mixed group, 25 (47%) were quadric/triplegic, 16 (30%) were diplegic, 9 (17%) were hemiplegic and 1 (2%) was paraplegic and 2 (4%) were unclassified.

Table 4 Number of people according to the categories of cerebral palsy

Category	No.	%
Spastic	48	74
Athetoid	6	9
Hypotonic	2	3
Ataxic	4	6
Mixed	5	8
All	65	100

4.4 Mental status

Thirty-two (49%) participants had mild mental retardation while another 20 (31%) were diagnosed as moderately retarded. The remaining 13 (20%) participants were of normal intelligence.

4.5 Caries status

The caries experience of the participants as measured by the mean DMFT index was 1.2 ± 1.9 (Table 5). Not many teeth were lost due to caries. The

filled (F) and the decayed (D) components contributed to most of the caries experience, and their percentages were 52% and 43% respectively.

Table 5 Caries experience and gender of people with cerebral palsy (n=65)

	Male	Female	Total
No. (%)	36 (55)	29 (45)	65 (100)
Decay Teeth (DT)	0.6 ± 1.5	0.3 ± 1.5	0.5 ± 1.5
Missing Teeth (MT)	0.1 ± 0.4	0.0 ± 0.2	0.1 ± 0.3
Filled Teeth (FT)	0.6 ± 1.3	0.6 ± 1.2	0.6 ± 1.2
Caries Experience (DMFT)	1.3 ± 2.0	0.9 ± 1.9	1.2 ± 1.9

Forty participants (62%) had no caries experience. For those remaining 25 participants with previous experience of caries attacks, the mean DMFT was 3.0 ± 2.0. The mean DT, MT and FT were 1.3 ± 2.2, 0.2 ± 0.5, 1.6 ± 1.6 respectively.

The mean DMFT of males and females were 1.3 ± 2.0 and 0.9 ± 1.9 respectively. The difference was not statistically significant (Table 6).

Table 6 Caries experience according to gender, mental status, brushing habit, parental assistance in tooth brushing and use of other cleaning aids

Group	Mean DMFT (SD)	No. (%)	Significance
Gender		65 (100)	NS
Male	1.3 ± 2.0	36 (55)	
Female	0.9 ± 1.9	29 (45)	
Mental status		65 (100)	NS
Normal	0.9 ± 1.1	13 (23)	
Mentally retarded	1.2 ± 2.1	52 (77)	
Daily brushing		65 (100)	NS
Once	1.0 ± 1.6	15 (20)	
More than once	1.7 ± 2.7	50 (80)	
Parental assisted brushing		65 (100)	NS
Yes	1.4 ± 2.4	29 (45)	
No	0.9 ± 1.5	36 (55)	
Use of other cleaning aids		65 (100)	NS
Yes	1.0 ± 1.6	35 (54)	
No	1.3 ± 2.3	30 (46)	

NS - Not statistically significant

The mean DMFT of normal and the mentally retarded (mild and moderate) participants were 0.9 ± 1.1 and 1.2 ± 2.1 respectively. The difference was not statistically significant.

The mean DMFT of the participants who were either receptive or manageable and those who were difficult to manage were 1.0 ± 1.5 and 2.1 ± 3.5 respectively. The difference again was not statistically significant.

4.6 Periodontal status

All participants were found to have bleeding after probing, of which thirty-seven (57%) were also found to have calculus deposits (Table 7).

Table 7 Periodontal health status of people with cerebral palsy (n=65)

	No.	%
% with Highest CPI = 0	0	0
% with Highest CPI = 1	28	43
% with Highest CPI = 2	37	57

CPI: 0 - Healthy, 1 - Bleeding after probing, 2 Calculus

4.7 Snack and oral habits

About two thirds (66%) of the participants did not snack the day before the examination, with the remaining taking snacks once or more. All participants practiced daily tooth brushing, 50 of them (77%) brushed twice a day and the remaining 15 (23%) brushed once a day. Their mean DMFT were 1.0 ± 1.6 and 1.7 ± 2.7 respectively (Table 6). The difference was not statistically significant.

Twenty-nine participants (45%) received parental assistance during tooth brushing, while 36 (55%) participants brushed their teeth by themselves. The mean DMFT for those who brushed with parental assistance was 1.4 ± 2.4 . For those who brushed themselves it was 0.9 ± 1.5 . The difference was not statistically significant.

Additional oral cleaning aids, including toothpicks, mouthrinse, inter-dental brush, dental floss were used by 35 (54 %) of the subjects. The most commonly used aid was mouthrinse (32%), followed by toothpicks (25%). Only 17% of the subjects used dental floss and less than 5% used inter-dental brush. The mean DMFT for those who had and those who had not used additional cleaning aids were 1.0 ± 1.6 and 1.3 ± 2.3 respectively. The difference was not statistically significant.

Chapter 5 Discussion

5.1 Sample size and response rate

Sixty-five out of eighty-nine invitees with CP participated in this survey. The response rate of our study was considered satisfactory. Only a few participants showed less interest in our study as they received regular dental check-ups. Children under 12 years of age were not included as they had mixed dentition and they were cared by the school dental care service provided by the Department of Health.

There are a total of 7 special schools in Hong Kong. Within the confined resources and available time, we managed to visit all three special schools run by the Spastics Association of Hong Kong. The sample size of the study would be larger and more representative if we could select samples and arrange screening for the remaining schools. While the present sample surveyed was by no means a random sample of the young people with CP, there were no obvious reasons to believe that the sample was biased. The results drawn may not be conclusive but would allow a rational understanding of the oral health status of young people with CP in Hong Kong.

5.2 Prevalence according to the types of cerebral palsy

Spastic was the most common type of CP reported in this study, followed by athetoid. The finding agreed with a previous study (Welbury, 2001). Tri/Quadraplegia were found to be the most common type amongst the spastic and mixed type of CP.

5.3 Caries experience of young people with of cerebral palsy

The caries experience of the CP young people in this study was 1.2, which was higher than that found in aged 12 (0.8) in a recent epidemiological survey (Department of Health, 2002). The higher caries experience could be attributed to an older age group in our study. The DMFT values of two previous reports on the caries experience of secondary school students aged 13 to 15 in Hong Kong were 1.4 and 1.6 respectively (Faculty of Dentistry, 2001; Kwan, 1992). These are comparable to the findings of our present study. Therefore, this study did not find a clinically significant higher caries rate in the young people with CP than the public.

Although the caries experience of the young people with CP is similar to those of the general population, we found that about half of the caries were not

treated. This might be due to the difficulty in accessing dental care and also the difficulty in their cooperation with the dental team. Studies reported that dentists encountered difficulties in treating these people. A lower quality of restorations and poorer oral hygiene in these people were also observed (dos Santos, 2003; Guare Rde and Ciamponi, 2003; Pope and Curzon, 1991).

The present study found that all participants brushed at least once daily with the use of toothpastes. As fluoridated toothpastes comprise the overwhelming majority of products available in Hong Kong, they were likely to use fluoridated toothpastes. Moreover, the water supply in Hong Kong is fluoridated. Such fluoride exposure was an indispensable factor which contributed to a low caries rate among the young people with CP.

Many participants received assistance when tooth brushing while others brushed themselves. However, the caries experience of those who brushed themselves was lower. It might be because those who were assisted to clean their teeth were in a state of more severe physical and mental incapability. In addition, we found that many parents and caregivers were not informed properly on how to brush the teeth of the children. As brushing techniques of

many of their caregivers were also questionable, this could be another reason for a higher caries experience among those who received assistance in tooth brushing.

5.4 Periodontal status of young people with of cerebral palsy

From our study, none of the participants had healthy periodontium, and more than half of them had calculus deposits. Comparing to the periodontal condition of the 12 years old children (Department of Health, 2002), the present study found a similar periodontal condition of the young people with CP.

A similar percentage of calculus deposits was found between the groups of people with CP and normal population. However, about 5% of the 12 years old children had healthy gums in Hong Kong. Despite regular tooth brushing, periodontal health of the young people with CP was found to be unsatisfactory, indicating there is still room for improvement in their tooth brushing techniques.

Many young people with CP received assistance in brushing. However, periodontal health of this population was poor. Therefore, it is necessary to evaluate the brushing methods that the parents and caregivers adopted to clean their children's teeth. This message was conveyed during the oral

health education talk. Most parents and caregivers understood the importance of regular tooth brushing. However, many of them neglected the importance of quality brushing in maintaining good oral health.

It was not easy to compare results of this study with those of many other studies conducted overseas because different score indices were used. While this study revealed that the periodontal health of the young people with CP and the general population were similar, a study in Denmark showed that the plaque index and gingivitis index of young people aged 14-15 with CP were higher than those of normal group (Nielsen, 1990). Another study in England showed that oral hygiene and gingival health of the young CP people with a mean age of 10 were worse than those of normal group (Pope and Curzon, 1991).

5.5 Outreach service

This community service has provided us with a good experience to serve the community directly. We learnt more about young people with CP, and gained useful experience in communicating with them and their parents. We also learnt more about the concerns of these people, their parents and caregivers.

In addition, all of us have gained valuable knowledge in planning, implementing and evaluating a service project. While many of us had been focusing on clinical practice in the dental school, this public health project allowed us to explore ways of oral health improvements and promotion from another perspective.

Some of the CP people were mentally disabled, while the others had normal mentality. Some had abnormal physical movements such as those who were ataxic could not maintain a steady posture for us to carry out the examination and fluoride therapy. Knowing the people well before seeing them would allow us to take proper precautions for management. It also reduced the anxiety of the people and enhanced the communication.

Portable dental equipment was used for this outreach service. For example, portable dental chairs and hand instruments such as CPI probes, fibre-optic light mirrors were used during examination. This allowed us to learn how to deliver dental care in a simple setting.

We also learnt some useful skills in the management of people with special needs. These people had short attention spans and could not tolerate lengthy examination and treatment. Therefore, careful and organized planning is essential to ensure a smooth flow of procedures. Apart from this, messages should be given slowly, repeatedly and in a simple way. Instructions were given one at a time for better understanding. A calm, audible voice and positive encouragements were necessary.

In addition, the help from the staff and teachers of the special schools were essential. Performing the procedures in the presence of staff gave a sense of security to the students with CP. Not only would this enhance communication but also build up mutual trust.

The oral health care talks were successfully held in the venues provided by the schools. In the hope of increasing the number of participating parents, the talks were held on the parents' days. Parents of the students with CP were satisfied with the talks and were concerned about the children's oral health. We reported our findings on their caries and periodontal status as well as other special oral features. Parents became aware of the necessity of dental check-ups for both themselves and their children.

In the group discussion, we approached the students with CP, their parents and taught them the use of different oral cleaning aids such as tooth brushing, dental flossing, inter-dental brush, single-tufted brush and mouth-rinse. Some students with CP were a little bit shy and apathetic at the beginning, but they then blended in and took an active role in the oral hygiene instruction demonstration.

In conclusion, we all learnt how to work harmoniously with the young people with CP. We all agreed this is a unique and valuable experience. We felt more confident in treating patients with CP in the future.

Chapter 6 Conclusion and Recommendations

6.1 Conclusion

This study conclude that

1. The caries experience of permanent teeth of young people with CP aged 12-18 in Hong Kong as measured by DMFT index was 1.2. About 60% of them had no caries experience.
2. None of the young people with cerebral palsy aged 12 to 18 in Hong Kong were periodontally healthy. More than half of them had calculus deposits.
3. All the young people aged 12 to 18 with cerebral palsy in Hong Kong brushed daily. Almost half of them had parental assistance in tooth brushing.
4. About half of the young people aged 12 to 18 with cerebral palsy in Hong Kong used additional cleaning aids such as mouthrinse, toothpick and dental floss. The most commonly used aid was monthrinse.
5. Professional topical fluoride varnish can be successfully delivered to young people with cerebral palsy.
6. Oral health talks in special needs schools were well received by students, their parents and caregivers.

6.2 Recommendations

1. The Department of Health should consider improving the health status of people with cerebral palsy. This may be achieved through educating the cerebral palsy community, aiming to increase dental awareness and improve oral hygiene.
2. The Department of Health should consider extending the school dental care service for the people with cerebral palsy to secondary school.
3. Dental undergraduates and graduates should be trained and encouraged to provide dental care for people with cerebral palsy. In the future, general dentists should be more capable of providing services to people with cerebral palsy.

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Faculty of Dentistry

Community Health Project 2007

Introduction

Each year, an outreach dental public health service is organized by a group of fourth year dental students, Faculty of Dentistry, the University of Hong Kong. This year we are grateful to have the project entitled 'Oral Health Status of Young People with Cerebral Palsy in Hong Kong'

Title: Oral Health Status of Young People with Cerebral Palsy in Hong Kong

Target group: Children suffering from cerebral palsy

Venue: Jockey Club Elaine Field School, Ko Fook Iu Memorial School and B.M. Kotewall Memorial School

Number of Anticipated Participants:

Date: 26/2/07 – 9/3/07

Members

Supervisor

- Dr. C. H. Chu
(Assistant Professor, Faculty of Dentistry, the University of Hong Kong)

Students

- Ho Lai In, Jenny
- Ip Yau Shing, James
- Li Ting Fung, Richard
- Ng Sze Wing, Sylvia
- Tsang Yuen Chi, Augustine
- Yeung Siu Hang, Andy
- Yip Wai Chau, Janice
- Zhang Chen, Johnson

Aim and Objective

1. To investigate the oral health status and habits of the spastic group in Hong Kong
2. To improve the oral health of spastic children
3. To arouse the social awareness of the oral health in spastics

Program

Children suffering from cerebral palsy selected from three special schools under the Spastic Association of Hong Kong will be examined. They are the B.M. Kotewall Memorial School, Jockey Club Elaine Field School and Ko Fook Iu Memorial School. A non-invasive clinical oral assessment of the participants and a survey concerning their oral hygiene habits will be conducted. The findings will be shared with the students and their parents in an oral health education session.

The assessment session will be held from 26/2/2007 to 3/3/2007. A one-day examination and data collection will be carried out in each school. The exact period of examination for respective schools may be extended, depending on the number of participants. A total of six examiners will carry out clinical assessment to find out the amount of tooth decay and gum status. Intra-oral photographs will be taken, with parental consent, for education, research and publication purposes.

Following examination, each participant will have to complete a simple close-ended questionnaire concerning his/her oral hygiene habits. A brief report about these findings and relevant significance will be given to individual student.

Three presentations will be given in the form of talks which will be held in the evenings between 7/3/2007 and 9/3/2007. The talk will last for one hour. Participants and their caregivers are invited to join. The session is mainly divided into three parts, a discussion of findings, an oral health education talk and a question and answer session. In the discussion, the general oral findings of the study will be shared. Comparison of the data will be made with the general population of the same age group. The oral health education talk will focus on the management of these common oral diseases, their preventions and dietary advices.

1. Preliminary dental check-up

Date and Time: 26/2/2007 – 3/3/2007

Target Group: **Students aged 12-18 years** from the 3 special schools

Format: Examiners will provide preliminary oral investigations in classroom.
Questionnaire concerning oral health and habit will be completed after the examination
Intra-oral photographs may be taken for research and teaching purpose.
A brief report of the individual student about the oral condition will be given

2. Oral Health Education Talk

Date and Time: 7/3/2007 – 9/3/2007 (Evening)

Target Group: Parents and students from the special schools

Format: Presentation will be given explaining the summery of findings from the study
Oral health education talk
Question and Answer section



Faculty of Dentistry

敬啟者：

為提高痙攣患者對口腔疾病及衛生的認識及社會各界對痙攣患者口腔衛生的關注，香港大學牙醫學院學生將於二月二十七日至二十八日在香港痙攣協會羅怡基紀念學校進行免費口腔衛生檢查及氟素治療。檢查後，家長將收到一份有關學生的口腔健康簡報。檢查及治療活動中，我們可能需要羅怡基紀念學校提供學生的相關病歷，亦可能為學生拍攝口腔照片。所有收集的資料將不會記名，內容將會保密。我們希望家長同意學生參加是次活動。

口腔衛生檢查後，我們將會在羅怡基紀念學校舉辦口腔衛生指導講座，日期及時間會稍後通知，歡迎有興趣之家長出席講座。

家長如有任何疑問，歡迎致電 9289 1752 曾先生或 2424 7766 玲姑娘查詢。

活動日期：二月二十七日至二十八日

活動時間：上午 九時三十分 至 下午 三時三十分

活動地點：香港痙攣協會羅怡基紀念學校

活動內容：問卷調查，免費口腔檢查及氟素治療

家長請填妥以下回條，並於 2 月 9 日前交回班主任以便匯集處理。

香港大學牙醫學院助理教授

朱振雄醫生

二零零七年二月一日

-----回條-----

同意書

本人已知悉通告的內容。本人同意 / 不同意 學生參加免費口腔衛生檢查及氟素治療。

學生姓名: _____

家長/監護人姓名: _____

學生班別: _____

家長/監護人簽署: _____

學生出生日期: _____

家長/監護人聯絡電話: _____



Faculty of Dentistry

敬啟者：

為提高痙攣患者對口腔疾病及衛生的認識及社會各界對痙攣患者口腔衛生的關注，香港大學牙醫學院學生將於三月一日至二日在香港痙攣協會賽馬會田綺玲學校進行免費口腔衛生檢查及氟素治療。檢查後，家長將收到一份有關學生的口腔健康簡報。檢查及治療活動中，我們可能需要賽馬會田綺玲學校提供學生的相關病歷，亦可能為學生拍攝口腔照片。所有收集的資料將不會記名，內容將會保密。我們希望家長同意學生參加是次活動。

口腔衛生檢查後，我們將會在賽馬會田綺玲學校舉辦口腔衛生指導講座，日期及時間會稍後通知，歡迎有興趣之家長出席講座。

家長如有任何疑問，歡迎致電 9289 1752 曾先生或 2348 9506 玲姑娘查詢。

活動日期：三月一日至二日

活動時間：上午 九時三十分 至 下午 三時三十分

活動地點：香港痙攣協會賽馬會田綺玲學校

活動內容：問卷調查，免費口腔檢查及氟素治療

家長請填妥以下回條，並於 2 月 9 日前交回班主任以便匯集處理。

香港大學牙醫學院助理教授

朱振雄醫生

二零零七年二月一日

-----回條-----

同意書

本人已知悉通告的內容。本人同意 / 不同意 學生參加免費口腔衛生檢查及氟素治療。

學生姓名: _____

家長/監護人姓名: _____

學生班別: _____

家長/監護人簽署: _____

學生出生日期: _____

家長/監護人聯絡電話: _____



Faculty of Dentistry

敬啟者：

為提高痙攣患者對口腔疾病及衛生的認識及社會各界對痙攣患者口腔衛生的關注，香港大學牙醫學院學生將於三月七日至八日在香港痙攣協會高福耀紀念學校進行免費口腔衛生檢查及氟素治療。檢查後，家長將收到一份有關學生的口腔健康簡報。檢查及治療活動中，我們可能需要高福耀紀念學校提供學生的相關病歷，亦可能為學生拍攝口腔照片。所有收集的資料將不會記名，內容將會保密。我們希望家長同意學生參加是次活動。

口腔衛生檢查後，我們將會在高福耀紀念學校舉辦口腔衛生指導講座，日期及時間會稍後通知，歡迎有興趣之家長出席講座。

家長如有任何疑問，歡迎致電 9289 1752 曾先生或 2697 6885 鍾姑娘查詢。

活動日期：三月七日至八日

活動時間：上午 九時三十分 至 下午 三時三十分

活動地點：香港痙攣協會高福耀紀念學校

活動內容：問卷調查，免費口腔檢查及氟素治療

家長請填妥以下回條，並於 2 月 9 日前交回班主任以便匯集處理。

香港大學牙醫學院助理教授

朱振雄醫生

二零零七年二月一日

-----回條-----

同意書

本人已知悉通告的內容。本人同意 / 不同意 學生參加免費口腔衛生檢查及氟素治療。

學生姓名: _____

家長/監護人姓名: _____

學生班別: _____

家長/監護人簽署: _____

學生出生日期: _____

家長/監護人聯絡電話: _____

問卷

Case: _____

這個不記名問卷對瞭解您的口腔衛生狀況非常有價值。完成這個問卷的時間不會超過一分鐘，您只要在選中的答案旁的方框內打“√”即可，謝謝。

1. 您昨天有沒有吃零食？

☐沒有 ☐有，一次 ☐有，多於一次

2. 您一天刷幾次牙？

☐少於一天一次 ☐一天一次 ☐一天兩次或更多

3. 您使用含氟化物的牙膏嗎？

☐是 ☐不是 ☐不確定/不知道什麼是氟化物

4. 您有沒有使用其他口腔清潔工具？(可選多項)

☐沒有 ☐牙籤 ☐漱口水 ☐牙線 ☐牙縫刷
☐其他(請註明:_____)

5. 有人協助您刷牙嗎？

☐有 ☐沒有

-完-

Questionnaire

Case: _____

This anonymous questionnaire provides us useful information in understanding your oral health. It takes you less than a minute to complete and please put a '✓' in the ☐ for your answer in each question. Thank you.

1. Did you snack yesterday between meals?

☐ No ☐ Yes, once ☐ Yes, more than once

2. How often do you brush?

☐ Less than once/day ☐ Once / day ☐ Twice or more than
twice / day

3. Do you use fluoridated toothpaste?

☐ Contained fluoride ☐ Did not contain fluoride ☐ Not sure/ Do not know what
fluoride is

4. Do you use additional oral cleaning aids? (Can choose more than one)

☐ No other cleaning aid ☐ Toothpick ☐ Mouth rinse ☐ Dental floss
☐ Interdental brush
☐ Others, please specify: _____

5. Does someone assist you in brushing your teeth?

☐ Yes ☐ No

-The End –

學生病歷

Name: _____

腦麻痺症分類

1. 痙攣型 (spastic type)	
2. 徐動型 (athetoid type)	
3. 共濟失調型 (ataxic type)	
4. 低張型 (hypotonic type)	
5. 混合型 (mixed type)	

1. 四肢痙攣 (quadriplegia) / 三肢痙攣 (triplegia)	
2. 下肢痙攣 (diplegia)	
3. 半身痙攣 (hemiplegia)	
4. 下半身痙攣 (paraplegia)	

藥物

是否正在接受藥物治療?

☐ 是☐ 否**抗癲癇藥:**

1. Dilantin
2. Ditoin cap
3. Phenytoin DBL amp
4. 其他: _____

高血壓

1. Nefidipine
- 其他: _____



Faculty of Dentistry

CONSENT (PHOTOGRAPH)

I consent to the Faculty of Dentistry of the University of Hong Kong to use intra-oral photographs taken of my child for the purposes of education, research and publication.

Student's name: _____ Guardian's name: _____

Class: _____ Guardian's signature: _____

Date: _____

同意書 (照片)

本人同意香港大學牙科學院採用為 敝子弟拍攝之口腔內照片，作為教育、研究或發表用途。

學生姓名: _____ 家長/監護人姓名: _____

學生班別: _____ 家長/監護人簽署: _____

日期: _____

Clinical Assessment Form

Name of participant: _____ Age: _____

Sex: M / F

School: B.M. Kotewall / Elaine Field / Ko Fook Iu

Date: _____

Examiner: James / Johnson

Recorder: Sylvia / Janice

Dentition Status

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

DMFT

0	Sound
1	Decayed
2	Filled, with decay
3	Filled, no decay
4	Missing, as a result of caries
5	Missing, any other reasons
6	Fissure Sealant
7	Bridge abutment or special crown or veneer/implant
9	Not recorded

APPENDIX VII: Oral examination charting form

Community Periodontal Index (CPI)

CPI

0	Healthy
1	Bleeding
2	Calculus

Management

Receptive / Manageable / Difficult to manage

香港大學牙醫學院
學童口腔健康調查

口腔健康調查報告撮要

_____ 家長:

多謝您同意 貴子弟於本月參加在校進行的口腔健康檢查。這是一個簡單的檢查，過程並不包括拍攝 X 光片。

經檢查後，我們發現 貴子弟

- ◆ 最少有____隻蛀牙,
- ◆ 口腔衛生情況 ☐良好 ☐一般 ☐欠佳

我們建議 貴子弟應 ☐ 盡快尋求牙科治療

☐ 六個月後接受口腔檢查。

香港大學牙醫學院

四年級第三組 及

導師朱振雄醫生

日期：二零零七年二月 日

List of materials and instruments

Documentation

1. Tables
2. Chairs
3. Pens x 3
4. Questionnaire x 50
5. Charting form x 50
6. Writing Board x 4
7. Erasers x 3, Pencils x 6 ,
8. Pencil Sharpener, scissors and tape

Instruments

9. Dental Chairs x 3
10. WHO Probes x 40
11. Fibro-optic mirror handles x3
12. Disposable mirrors x 120
13. Plastic wrap for mirror x 120
14. Vaseline
15. Q tips for Duraphat varnish x 200
16. Duraphat varnish x 2
17. Paper Cups x 120
18. Disposable disposable dappen dishes x 120
19. Paper Towel x 3
20. Gauze x 2 pack
21. Cotton roll x 2 packs
22. Plastic bags for trash x 9
23. Boxes of facial tissues

Protective Wear

24. Gown x 20
25. Glove x 2 boxes (M & S)
26. Protective Eyewear x 2
27. Face Mask x 1 box

APPENDIX IX: List of materials and instruments

Accessory

- 28. Laptop computers x 2
- 29. Camera set and Ring Flash
- 30. Battery Charger and additional battery for Canon Camera
- 31. Retractors (3 sets) and 3 sets of occlusal and side mirror
- 32. Disinfectant for cold sterilization of mirrors and retractors
- 33. Containers for cold sterilization
- 34. AA Enegizer x 4
- 35. Name Tags
- 36. Electical Extension Cord
- 37. Water Boiler
- 38. Bottle of waters x 2
- 39. Alginate mixing bows x 2



Faculty of Dentistry

敬啓者：

香港大學牙醫學院月前於 貴校舉行的學童口腔檢查，承蒙 貴校及家長的支持，活動經已完滿結束。本組將於四月十八日於 貴校舉行口腔衛生常識講座，內容包括是次口腔檢查報告、口腔衛生常識及指導，誠邀 閣下及子女參與，活動詳情如下：

日期： 二零零七 年 四月十八日 （星期三）

時間： 上午 十 時

地點： 學校禮堂

家長如有任何疑問，歡迎致電 2424 7766 玲姑娘查詢。

家長請填妥以下回條，並於三月三十一日前交回班主任以便匯集處理。

香港大學牙醫學院助理教授

朱振雄醫生

二零零七年三月十七日

-----回條-----

本人_____ 家長已知悉通告的內容，並（願意 / 不願意）

參加是次口腔衛生講座，出席人數為_____人。

學生姓名: _____

家長/監護人姓名: _____

學生班別: _____

家長/監護人簽署: _____